

Smart Soles

Navigation for the Differently Abled

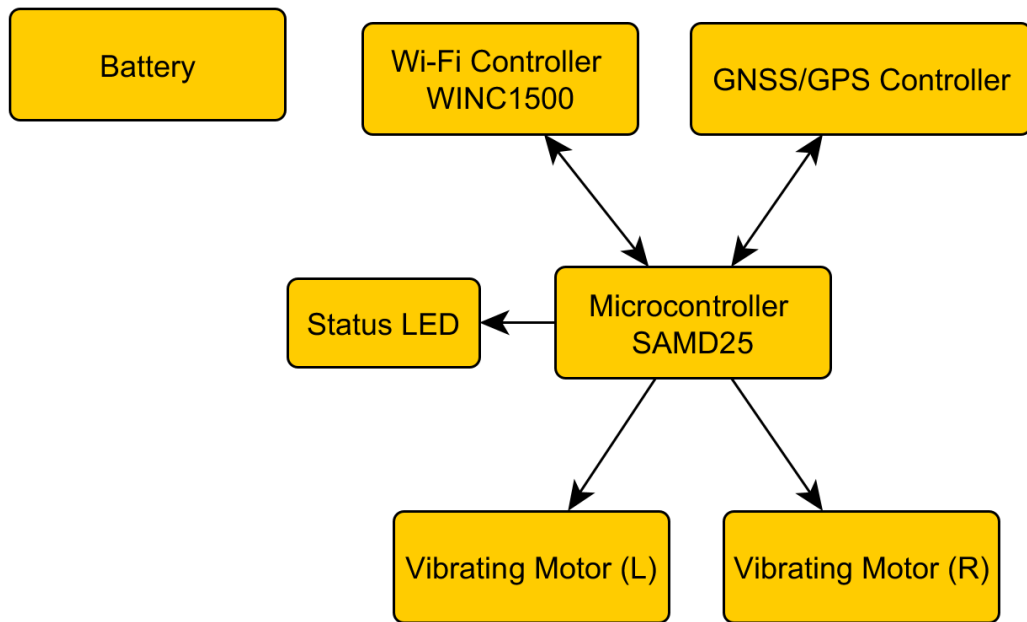
I wish to build an IoT connected insoles to assist the differently-abled population (sight or sound impaired, for instance) safely navigate to their destination using directions provided in the form of haptic feedback from the shoes.

My idea of this device would consist of the following:

- 4 x Vibrating motor (or any low current motor) – two in each shoe
- 2 x Motor Drivers – each can drive up to 3 motors
- Wi-Fi chip to fetch instructions from a server – these instructions will trigger the motors when user needs to change their trajectory
- GNSS / GPS chip to get position of the user – this is a necessary input in determining when to activate the motors

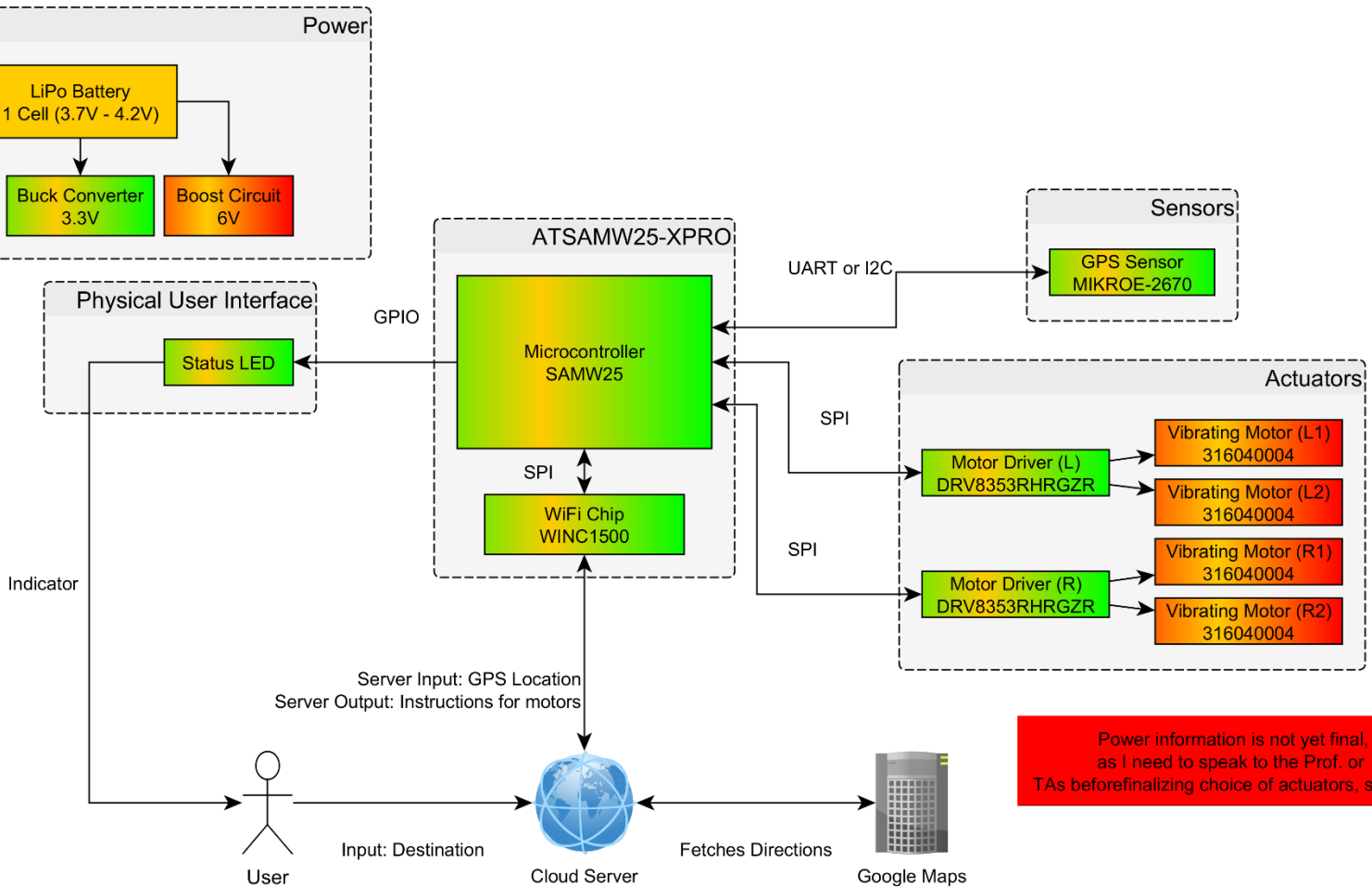
Considerations: If GPS turns out to be too expensive, can be figure out a lower cost alternative to localize the user using Wi-Fi perhaps? The tradeoff would be cost vs. accuracy.

Simple System Diagram



Component	MPN	Manufacturer	PN	Source	Min. Volt.	Max. Volt.	Interface to MCU	Qty	Cost QTY1	Cost QTY1K	Comments	Link
Dev Board	ATSAMW25-XPRO	Microchip	ATSAMW25-XPRO	digikey	4.3V	5.5V		1	41.04	40	ESE516 MCU + SoC Wifi	
GPS Sensor	MIKROE-2670	MikroElektronika	1471-1837-ND	digikey	3.3V	5V	IO Pins	1	41.82	41	Need to get Prof.'s feedback on what the best way to get location (coordinates) of the user would be	
Vibrating Motor	316040004	Seeed Technology	1597-1245-ND	digikey	DC 2.5V	DC 3.5V	IO Pins	4	1.44	1.2	Need to do additional research to find out what the optimal strength of the motor should be. I am counting in 4, since I plan on using 2 motors in each of the 2 soles.	Here
Motor Driver	DRV8353RHRGZR	TI	595-DRV8353RHRGZR	mouser	9V	75V	IO Pins	2	6.11	3.07	Provides 350mA current output and can drive 3 motors, which should be more than enough for the vibrating motors. There is also an alternative version available (\$5.79), which does not provide the 3 voltage shunt amplifiers this model provides.	Here
								Total	100.84	91.94		

Detailed System Diagram



Power information is not yet final, as I need to speak to the Prof. or TAs before finalizing choice of actuators, sensors.